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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,294	10/09/2001	Abram M. Castro	117821-130	6011

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EXAMINER

PATEL, ISHWARBHAI B

ART UNIT PAPER NUMBER

2827

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/973,294

Applicant(s)

CASTRO ET AL.

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 and 21-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-9 and 19-23, drawn to a circuit board, classified in class 174, subclass 255.
 - II. Claims 10-18, drawn to a process for making a circuit board, classified in class 29, subclass 830.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as the providing and removing the rigid supports from outer faces are not required in the products. Further, forming the first and the second release layers are not needed in the product and also the etching step is not required in the product and if required can be carried out by other process than the chemical etching.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the

search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

4. If Group I, claims 1-9 and 19-23, is elected, applicant to elect a single specie with claims directed to the elected specie.

Group I of this application contains claims directed to the following patentably distinct species of the claimed invention.

(I) Specie I Figure 1-34.

(I) Specie II Figure 35.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims

are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

5. During a telephone conversation with Edward I. Jorgenson (34,194) on November 22, 2002, a provisional election was made with traverse to prosecute the invention of a circuit board, claim Claims 1-9 and 19-23. Affirmation of this election must be made by applicant in replying to this Office action. Claim 10-18 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear what the applicant is claiming by "first and second laminates are free of layer to layer contact with a metallic support plate. Is metallic plate claimed or not?

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-4, 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takenouchi et al., US Patent No. 5,744,758, hereafter Takenouchi.

Regarding claim 1 and 6, Takenouchi discloses a circuit board, comprising:

a first laminate made of a fusible dielectric material (first substrate 12, see figure 1-2, column 5, line 60-65),

a second laminate made of a fusible dielectric material bonded to the first laminate along respective inner face thereof (substrate 12 and 12a, see figure 1-2, column 6, line 1-20),

a plurality of exposed first electrical contacts on an outer face of the first laminate; a plurality of exposed second electrical contacts on an outer face of the second laminate (circuit pattern 22, see figure 1-2, column 6, line 1-30); and

a plurality of electrical conductors each running from a first contact to a second contact the conductors including elongated conductive lines extending along one of the first or second laminated and vias extending through the first and second laminates which have been filled with an electrically conductive filler (circuit pattern 22 and via 20 filled with electro-conductive material, see figure 1-2, column 1-30). Takenouchi fail to disclose the first laminate directly connected to the second laminate. However, the substrate made with two or more than two layers are known in the art and the number of laminates may be decided based on the pad density and density of the traces for power, ground and signal, required for the specific requirement. Further, any inner circuit pattern can be used as ground or power planes depending upon the specific requirement. Therefore, it would have been obvious to one having ordinary skill in the

art at the time the invention was made to provide the circuit board of Takenouchi with the first laminate directly connected to the second laminate in order to have the circuit board with required connection points and the traces.

Regarding claim 2, though Takenouchi does not explicitly disclose the laminates with reinforcing fibers, it is known in the art to use such reinforcement in order to have the required mechanical strength. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Takenouchi with laminates impregnated with reinforcing fiber in order to improve the mechanical strength of the substrate.

Regarding claim 3, Takenouchi further discloses contacts configured as die pad and solder bond pads, see figure 2.

Regarding claim 4, Takenouchi discloses all the features of the claimed invention as shown above except the solder mask layer. However, such mask layer is known in the art for protecting the outer surfaces and also to avoid short circuit of the solder with the adjacent contacts. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Takenouchi with the solder mask layers in order to avoid short circuit with the adjacent contacts.

Regarding claim 8, Takenouchi further discloses all the features of the claimed invention including the third laminates as applied to claim 1 and 6 above, see figure 1-2.

Regarding claim 9, Takenouchi further discloses first and second laminates free of layer-to-layer contact with a metallic support plate (Takenouchi does not disclose any support plate).

11. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified circuit board of Takenouchi et al., US Patent No. 5,744,758, hereafter Takenouchi, as applied to claims 1-4 above, and further in view of Gallagher et al, US Patent No. 5, 948,533, hereafter Gallagher.

Regarding claim 5, Takenouchi discloses all the features of the claimed invention except the via filler consist of essentially of a transient liquid phase sintering conductive adhesive. However, use of such material for electrical connection is known in the art. Gallagher discloses such material for the apparent reason of reliable electrical interconnection. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Takenouchi with the via filler consisting essentially of transient liquid phase sintering material, apparently in order to have reliable electrical interconnection. Further, it has been held to be within the general skill of a worker in the art to select a known material

on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125, USPQ 416.

Regarding claims 7, Takenouchi further discloses all the features of the claimed invention including power and ground connection as applied to claims 1 and 6 above.

12. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over modified circuit board of Takenouchi et al., US Patent No. 5,744,758, hereafter Takenouchi, as applied to claims 1-4 above, and further in view of Huang et al., US Patent No. 6,359,341, hereafter Huang.

Regarding claims 19-20, Takenouchi discloses all the features of the claimed invention except the heat sink having central opening bonded to the outer face of the first laminate. However providing such heat sink made of metal plate is known in the art for dissipating the heat from the system. Further, such plates also are used as shield or stiffener over and above dissipating the heat depending upon the specific requirements. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Takenouchi with heat sink as taught by Huang in order to dissipate the heat from the system.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Akram et al., Kawakita et al., Schmidt et al., Enomoto, Echigo et al., Mizutani et al., Kinoshita et al., Hayashi, Kobayashi, Rokugawa et al., discloses assembly with circuit board similar to applicant's claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
December 1, 2002


ALBERT W. PALADINI
PRIMARY EXAMINER